

CASE REPORT

Massive subcutaneous emphysema after removal of tracheostomy cannula

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Accepted 12 May 2004

Introduction

We report a case of massive subcutaneous emphysema after removal of tracheostomy cannula. The patient suffered a tracheo-esophageal laceration from a gunshot wound traversing the neck. The trachea and esophagus were repaired with a protective tracheostomy. The tracheostomy cannula was removed 9 days later and the patient discharged home. He returned to the emergency room in 48 h

with dyspnea and massive cervical subcutaneous emphysema. The skin appeared to have closed over the former tracheostomy site. Needle decompression was performed with complete relief of symptoms.

Case report

A 25-year-old male, victim of multiple gunshot wounds to the left axilla and left side of his neck, was brought in to the Emergency Room in stable

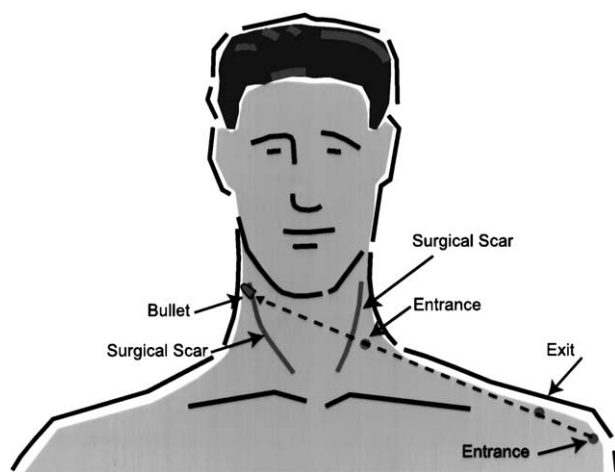


Figure 1 Schematic presentation of the trajectory of the bullet that entered originally through the left shoulder and lodged in the right anterior cervical region perforating the upper esophagus.



Figure 2 Schematic presentation of a case of massive subcutaneous emphysema post tracheostomy cannula removal at the time of presentation to the Emergency Department. Notice the massive neck swelling that the patient developed 3 days after removal of the tracheostomy cannula.

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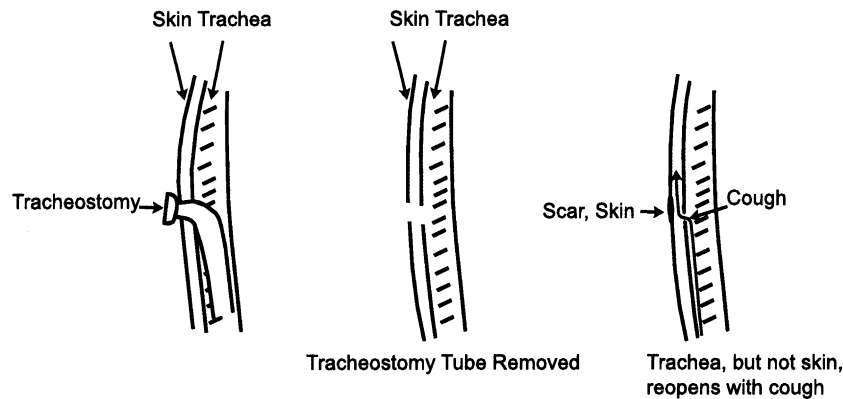


Figure 3 Hypothetical sequence of events leading to massive subcutaneous emphysema after removal of tracheostomy cannula.

condition. On physical examination a bullet was palpated in the right anterior triangle of the neck. The left side of the neck was explored. A laceration of the esophagus, massive edema of the larynx and a contusion of the left common carotid artery were identified. He underwent exploration of the right side of the neck (Fig. 1), repair of the esophagus and tracheostomy. His recovery was uneventful and he was discharged home at 9 days. Prior to discharge, the tracheostomy cannula was removed. The patient was readmitted 3 days later complaining of dyspnea and swelling of his neck. He was uncertain whether coughing precipitated the event or accompanied it. Massive cervical subcutaneous emphysema was apparent on physical examination (Fig. 2). The tracheostomy site appeared healed. A 14-gauge angiocath was inserted in the left anterior triangle and gas was released with a dramatic decrease in the swelling. The angiocath was left in place for further decompression. The patient was discharged 2 days later in stable condition with complete relief of the symptoms. The catheter was removed prior to discharge.

Discussion

Massive subcutaneous emphysema after removal of a tracheostomy cannula with closure by secondary intention is a rare complication. We could not identify any reports of such a case in the English literature. Subcutaneous emphysema, however, can appear after primary closure of a permanent tracheostomy or after surgical closure of a

tracheocutaneous fistula.^{1–4} The probable mechanism for massive subcutaneous emphysema in our case was premature closure of the skin over the tracheostomy site by a relatively thin membrane of neo-epithelium and granulation tissue, without closure of the underlying trachea by granulation tissue. A similar situation can appear in cases of primary closure of tracheo-cutaneous fistulas. Alternatively, both trachea and skin closed, skin more securely, and a cough disrupted the granular tissue closure of the tracheostomy but not the overlying layer of skin (Fig. 3). Resultant massive emphysema can be life-threatening³ and requires immediate attention. We learned from this case to monitor closely patients after removal of tracheostomy cannulas and to instruct them to seek immediate attention should swelling of the neck occurs. Simple needle decompression is a satisfactory treatment for evacuation of the air. The trachea heals spontaneously.

References

1. Keenan JP, Snyder III G, Lehman WB, Ruiz JW. Management of tracheocutaneous fistula. *Arch Otolaryngol* 1978;104: 530–1.
2. Lipman RM, Deutsch TA. Subcutaneous air after closure of a tracheocutaneous fistula. *Arch Opht* 1992;110: 1644–5.
3. Mickelson SA, Rosenthal L. Closure of permanent tracheostomy in patients with sleep apnea: a comparison of two techniques. *Otolaryngol Head Neck Surg* 1997;116:36–40.
4. Wiel E, Fayoux P, Vilette B. Complications of surgical closure of tracheo-cutaneous fistula in pediatric patients—two case reports. *Int J Pediatr Otorhinolaryngol* 2000;52:97–9.